

SCIENCE & EDUCATION Impact

Benefits from USDA/Land-Grant Partnership

Keeping the Profits in Soybeans

Resisting disease and pests makes all the difference.

With tight commodity prices, successful pest control can mean the difference between red and black ink. Land-Grant universities and the U. S. Department of Agriculture (USDA) work together to bring soybean producers solutions to weed, insect and disease problems.

Payoff

- **Resisting SCN.** The yield-robbing soybean cyst nematode (SCN) has threatened the U.S. crop since the 1950s, biting \$500 million out of soybean producers' pockets each year and reducing yields by as much as 75 percent. Land-Grant universities have responded with improved varieties. **Missouri** scientists hit pay dirt while studying soja, the wild, ancestral relative of the cultivated soybean found in China. After screening 10 lines, they discovered one of the lines had a gene for resistance not present in cultivated soybeans today. **Iowa State, Illinois** and USDA are collaborating on the research. In 1999, **South Dakota State** released a new SCN-resistant soybean variety called Turner with excellent yield potential and resistance to phytophthora root rot. **Tennessee** researchers released Fowler, resistant to race 2 of the soybean cyst nematode. Seed is expected to be available to farmers within two years. **Georgia's** Center for Soybean Improvement combined high-yield properties from a commercial soybean with disease resistance from a Florida release. The Prichard soybean is resistant to three common races of SCN, to southern root-knot nematode, and to the G1 strain of soybean mosaic virus. This new variety averages six percent higher yields than standard cultivars.
- **Stop the stem borer.** Dectes stem borer can devastate a field of soybeans, damaging more than half the crop. Larvae weaken the plant stem and cause lodging; control is difficult. **Delaware** Extension evaluated cultural practices and found that varieties resistant to soybean cyst nematode have the greatest tolerance to Dectes stem borer. They also found that lodging decreased when soybeans were planted at a higher population. Depending on the growing season, growers could increase gross profits by \$40 per acre using high-yielding SCN resistant varieties planted in 7.5-inch row spacings.

RESEARCH,
EXTENSION AND
EDUCATION
AT WORK

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- **Get the weeds out.** A software program developed by **Nebraska** weed scientists helps soybean farmers – and producers of other row crops – choose best options for weed control. WeedSOFT features include economic and environmental assessments, biologically based weed management recommendations, control options, weed identification images, soil maps and groundwater contamination scenarios based on herbicide and soil type interaction. At least 500 groups and individuals now use WeedSOFT to aid weed management decisions on nearly 1 million acres. It's estimated that herbicide use has been reduced roughly 20 percent to 30 percent on these acres. In related work, **Nebraska** and **North Carolina State** researchers teamed to lead a USDA-funded national effort to promote widespread implementation of weed management decision-aid software in coming years.
- **Variety is the spice of life.** Selecting the best variety for Arkansas farms is a breeze with SOYVA, a comprehensive, computerized program that helps producers select the most suitable varieties for their specific growing conditions. The information can be downloaded from an **Arkansas** extension web site.
- **It's all in the timing.** Planting soybeans earlier could relieve some growers of insect pressures. **Georgia** researchers are studying the feasibility of planting an early-maturing soybean variety earlier in the season (around mid-April) to escape pests that hit in late August through September. Called Early Soybean Production System, research from 1997 to 1999 showed the system yields as well as conventional soybeans and helps growers avoid yield losses associated with summer droughts. If half of Georgia's soybean crop were planted this way, more than \$2 million would be saved in insect losses. When weather delays soybean planting past June 15 in southern states, yields take a hit. **Louisiana** scientists are studying varieties and cultural practices that minimize yield losses. They found decreased row spacings to 20 inches or less helped accelerate vegetative growth and increased pod production. Steps to avoid drought and waterlogging help, too, including irrigation and grading and ditching of fields. The scientists also screened varieties that would best thrive if planted late.

- **Back to basics with diseases.** Phytophthora plant diseases cause estimated worldwide annual crop losses of more than \$10 billion. In Ohio, root and stem rot, caused by *Phytophthora sojae*, results in annual losses of about 24 million bushels, or 12 percent of the state's soybean production. phytophthora is part of an obscure fungus-like group of organisms, and little is known about their genetic makeup. In collaboration with researchers at several national and international institutions and industry partners, scientists at **Ohio State** have begun an ambitious project to identify all the genes of phytophthora. This basic research will lead to novel genetic and biotechnological control methods, resulting in less chemical use and yield loss. A 10 percent reduction in losses to phytophthora root rot would yield Ohio growers an additional 2.4 million bushels of soybeans each year.



**Cooperative State Research, Education,
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Cooperative State Research, Education, and Extension Service in cooperation with the Extension Committee on Organization and Policy, the Experiment Station Committee on Organization and Policy, the Academic Programs Committee on Organization and Policy, the International Programs Committee on Organization and Policy, and the Louisiana State University Agricultural Center.

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